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Dictyostelids from Ukraine 1: two new records of *Dictyostelium*

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Abstract —Two new records of *Dictyostelium* were isolated from leaf litter, and forest soil collected from Yalta, Crimea, Ukraine. Their descriptions and photographs of important life cycle stages are provided.

Key words —cellular slime mold, taxonomy

Introduction

Cellular slime molds, or dictyostelids, live primarily in field and forest soil and leaf litter and on animal dung where they feed selectively on bacteria (Singh 1947, Cavender & Raper 1965a,b). They are important agents in forest ecosystems by bringing changing soil bacterial flora. They are also ideal for investigating problems in cellular and developmental biology. *Dictyostelium*, *Polysphondylium*, and *Coenonia* (*Dictyosteliaceae*) and *Acytostelium* (*Acytosteliaceae*) are taxonomically placed in the order *Dictyosteliales* (Kirk et al. 2008). *Dictyostelium* is the oldest and largest dictyostelid genus and the first described species, *D. mucoroides* Bref., was first isolated and described from horse dung by Oskar Brefeld in 1869 (Raper 1984). Worldwide, approximately 60 *Dictyostelium* species have been described (Kirk et al. 2008). This paper is the first to report on dictyostelid in Ukraine.

Materials and methods

The authors collected 60 soil, grass, and leaf litter samples on October 8 and 10, 2008, in Baydar Valley, Eski-Kermen and Angara Valley, Yalta, Crimea, Ukraine. The samples were kept at 4 °C and isolated according to He & Li (2008). Five agar plates per sample were isolated and incubated at 23 °C with 12 h light

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and 12 h darkness. The location of each early aggregate clone and sorocarps was marked. The life cycle stages of cell aggregation, pseudoplasmodium, and sorocarp were observed under a Nikon dissecting microscope (SMZ1500) with 0.75–11.25× range (10× oculars). Spores, stalks, and sorocarps were measured using a Nikon light microscope (SMZ1000) with 10× oculars and 10, 40, and 100× (oil) objectives. Photographs were taken with a Canon S70 camera.

Taxonomy

1. ***Dictyostelium implicatum*** H. Hagiw., Bull. Natn. Sci. Mus., Tokyo, Ser. B, 10(2): 63 (1984). Fig. 1 A–H

Sorocarps solitary, usually unbranched or sometimes irregularly branched, phototropic, sometimes tangled, usually prostrate. Sorophores colorless, sinuous, thin, 0.5–4.5(–10) mm long, tapering from bases to tips, bases conical sometimes expanded by basal disks, tips acuminate. Sori white, globose, 80–290 μm diam. Spores hyaline, elliptical, usually 6.6–8.8 × 3.7–5.0 μm, without polar granules. Cell aggregations radiate. Pseudoplasmodia not migrating without sorophore formation, usually producing single sorogens.

Specimens examined: MR039. Isolated in 2009 from leaf litter collected by the authors in Baydar Valley (8 Oct. 2008, S0120) and Angara Valley (10 Oct. 2008, S0164), Yalta, Crimea, Ukraine. Deposited at the Herbarium of Mycological Institute of Jilin Agricultural University (HMJAU), Changchun, China.

Comments—*Dictyostelium implicatum* strongly resembles *D. brefeldianum* H. Hagiw. (Hagiwara 1984) in growth habit, sorocarp dimensions, pattern of cell aggregation, and the shape of sorophore bases. But *D. implicatum* is distinguished from *D. brefeldianum* by three characteristics. Firstly, some sorocarps become tangled when its spores are inoculated in the center of a bacterial colony on the agar plate in diffuse light. Secondly, *D. implicatum* sorophore tips are acuminate, but *D. brefeldianum* has capitate sorophore tips. Thirdly, *D. implicatum* spores are elliptical and larger than the oblong spores of *D. brefeldianum* (5.4–7.5 × 3.0–4.2 μm).

2. ***Dictyostelium tenue*** Cavender, Raper & Norberg, Amer. J. Bot. 66(2): 213 (1979). Fig. 1 I–O

Sorocarps typically clustered, erect or semi-erect, phototropic, unbranched or branched near the base. Sorophores slender and delicate, colorless, consisting of one tier of cells except for bases, 1–6 mm long, bases slightly bulbous, tips capitate, sometimes prostrate. Sori milk-white, globose, mostly 45–125 μm diam. Spores hyaline, short, elliptical, usually 4.8–7.0 × 2.5–3.8 μm, with polar granules. Cell aggregations develop as streamless mounds. Microcysts produced in some strains, macrocysts not reported or observed.

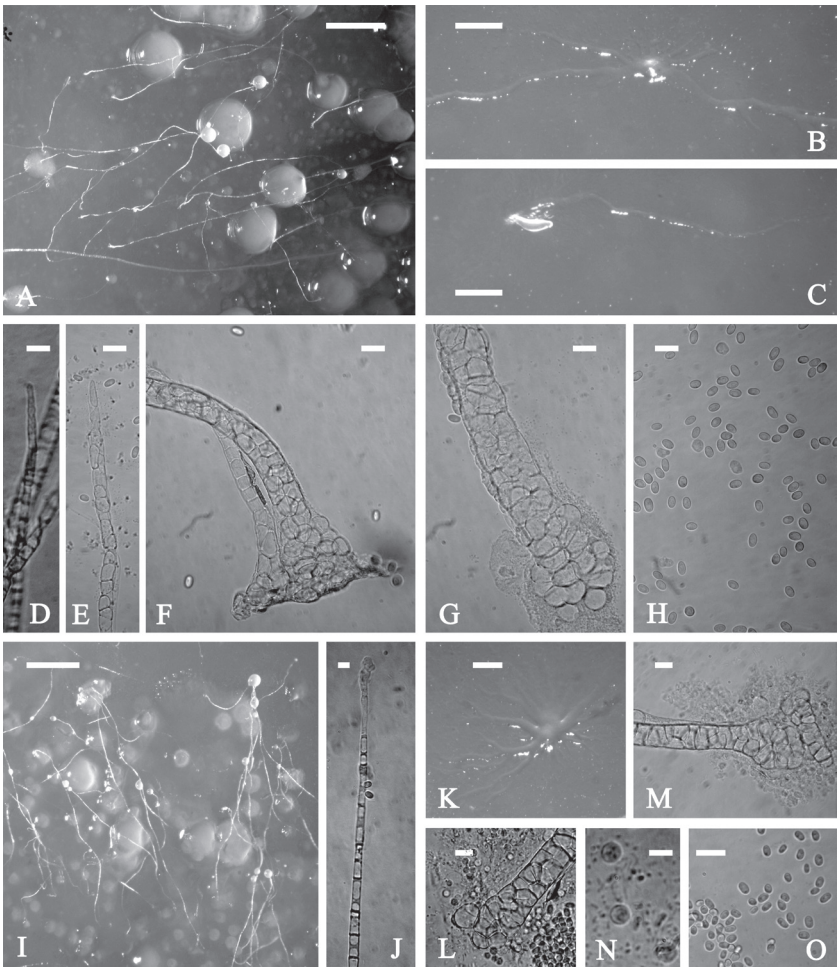

Figure 1. A–H, *Dictyostelium implicatum*; I–O, *D. tenue*. A, I, Sorocarps (bar = 1 mm); B, K, Cell aggregations (bar = 0.3 mm); C, Pseudoplasmodia (bar = 0.3 mm); D, E, J, Sorophore tips (bar = 15 μm); F, G, L, M, Sorophore bases (bar = 15 μm); H, O, Spores (bar = 15 μm); N, Microcysts (bar = 5 μm).

Specimens examined: MR040. Isolated in 2009 from forest soil collected by the authors in Baydar Valley (8 Oct. 2008, S0127), Yalta, Crimea, Ukraine. Deposited at the Herbarium of Mycological Institute of Jilin Agricultural University (HMJAU), Changchun, China.

Comments—This species resembles *D. multistipes* Cavender (Cavender 1976) in growth habit, cell aggregation, sorocarps, and irregularly branching

near the base. However, *D. tenue* has longer, more slender sorocarps than *D. multistipes* and show no yellow pigmentation. In addition, *D. tenue* resembles *D. monochasioides* H. Hagiw. (Hagiwara 1973), which differs in having a typically unbranched sorophore.

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